

Young Einsteins

Calgary Herald (Alberta, Canada)

November 30, 1991, Saturday, FINAL EDITION

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Section: LIFE TODAY; Pg. D11

Length: 2467 words

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Body

The future is in good hands, judging by how many budding young scientists there are.

Elementary and junior high students responded overwhelmingly to the Calgary Science Network's first-ever citywide science essay contest, held to celebrate 1991 National Science and Technology Week. The network is a volunteer group of scientists and science educators devoted to raising public awareness of science.

Teachers culled 122 finalists from more than twice that many entries in dozens of Calgary and area schools. Grades 5, 6, 7 and 8 students had a choice of four questions focusing on recycling, global warming, inventions and the impact of science and technology.

Grade 6 had the highest number of finalists with 65. Grade 7 had the lowest, with 11. Your turn next year, Grade 7.

Volunteer expert judges picked nine winners and five honorable mentions. Some essays were good, but much longer than contest rules permitted. First, second and third prizes, for each grade, are \$ 250, \$ 200 and \$ 150. Schools of first-place winners also get a trophy, and all winning schools receive \$ 50 to buy science equipment or materials.

And the big winners are ... !

Grade 5

1st: Stuart MacDonald, Mayland Heights Elementary.

2nd: Michael Tobin, Sundance Elementary.

3rd: Carol Hoover, Brentwood Elementary.

Honorable mention: Amanda Yakiwchuck, North Haven Elementary; Megan McDonald, Chinook Park Elementary.

Grade 6

Tie for 1st: Ewan Fraser, Chinook Park Elementary; and Courtney Swan, Sundance Elementary.

3rd: Diane Shehata, St. Michael Elementary.

Honorable mention: Nicole Labrie, Ecole Ste Anne.

Grade 7

No 1st, 2nd or 3rd awarded by judges.

Young Einsteins

Honorable mention: Michelle Girard, Father Whelihan.

Grade 8

Tie for 1st: Leila Sebastian, St. Bonaventure; and Dittu Bharatha, Simon Fraser.

3rd: Marcus Vaska, Simon Fraser.

Honorable mention: Nicole LaPorte, Langevin.

Contest judges: John Kendall, dean of science at University of Calgary; Sally Banks, science writer and broadcaster; Laura McCormack, professional engineer.

Contest prize sponsors: Canadian Science Writers' Association; PanCanadian Petroleum Limited; Royal Society of Canada; Science Alberta Foundation.

Student science page sponsored by the Calgary Herald.

Here are excerpts from the first-place winners.

By Leila Sebastian

Grade 8, 1st Place (tie)

"Leila A. Sebastian Environmental Consultants" prepared this report on global warming for Alberta Environment Minister Ralph Klein. Leila described how an average global temperature rise of even one degree celsius would trigger worldwide climate change.

... If the present trends continue, according to estimates the Earth will warm by 1.5 to 4.5 degrees Celsius by the next century ...

There is nothing extraordinary about climate change. There have been several Ice Ages, where the majority of the province of Alberta was completely covered by continental glaciers. We do not fully know where we are on the cycle (of natural climate change).

If the weather gets warmer, there will be an increase in cloud. Clouds reflect back the incoming (solar) radiation, and cast shade and produce a cooling effect. If there are many volcanic explosions, the dust particles in the air will produce a cooling effect.

The study of the complex interactions in the Earth's biosphere is only just beginning. Many important factors are poorly understood. The oceans and the forests of the Earth use much carbon dioxide (a greenhouse gas) and may use more as the temperature increases, providing a long-range balancing effect.

While much has been written about the potential dangers of the deforestation of the tropical rain forests, it has just been shown that the peat bogs of northern Canada have an important role in the control of carbon dioxide and methane, and absorb great quantities of nitrous oxides (acid rain) ...

If the global warming thesis is correct, it will have major implications for the Alberta climate. The best information that is available to date suggests that the weather patterns will shift to the north, so that Calgary will experience the weather now seen in Denver - both warmer and drier ...

Calgary is already a dry area ... if there is a shortage of water, how will we be able to provide water for the city and for irrigation for the farms in southern Alberta ... Will an even greater portion of our food be imported .. ?

If the coastal areas of North America are flooded, and central North America becomes a desert, there will be a serious relocation of population. Alberta will have a climate that is attractive to many. If the population grows, this will make the problems of water and food even more difficult ...

Young Einsteins

Leila concluded her report with several recommendations to the environment minister:

- * Immediate formation of a high-level government committee to study the ability to supply water to cities and agriculture in southern Alberta ...
- * A similar task force to study the potential power needs of a rapidly growing population, and our ability to produce enough power with the (reduced) amount of water available for hydroelectricity.
- * A study of our food needs should be done, reflecting on our population, climate changes and transportation needs.

By Dittu Bharatha

Grade 8, 1st Place (tie)

Global warming was a "hot" topic with many environmentally conscious students. Dittu, whose essay included computer graphics, discussed how Earth's atmosphere acts like a greenhouse.

In the Earth's atmosphere, the role of glass is played by greenhouse gases such as carbon dioxide, nitrous oxide, methane and CFCs.

The burning of fossil fuels in automobiles and power plants has resulted in a significant increase of carbon dioxide (CO₂) in the atmosphere. In spite of the increased dissolution of CO₂ in the oceans and removal of it by plant life, amounts continue to escalate ...

Gaseous emissions (methane) from animals can affect global warming. Nitrous oxide from burning fossil fuels and CFCs from aerosol cans, some styrofoams and refrigerants not only contribute to the greenhouse effect, but also to the depletion of the ozone layer ...

Deforestation contributes to the greenhouse effect by decreasing the amount of CO₂ absorbed by plants. Pollutants (such as acid rain) from cities, which contribute to global warming themselves, may be harming plant life which in turn will increase the greenhouse effect ...

For Calgary, the possible effects are:

- * Warmer climate may produce longer growing season for agriculture and more pleasant climate for outdoor activities.
- * Increased precipitation, due to higher temperatures and more clouds, which may reduce global warming.
- * Solar heating may become more feasible, leading to reduction of gas consumption for home heating.
- * Depletion of ozone layer above Calgary may increase incidence of skin cancer due to more exposure to ultraviolet radiation.
- * Increased melting of glaciers which feed the Bow River could cause flooding ...

Dittu noted that global warming is a "highly contested issue," and then offered several ways to minimize its impact:

- * Car pool to conserve gas (a fossil fuel). Use new fuels which have clean-burning ethanol in them (fewer CO₂ emissions). Design more fuel-efficient vehicles.
- * Conduct research on safe alternative power sources (solar especially).
- * Recycle paper to avoid deforestation. Do extensive reforestation.
- * Avoid buying products with CFCs (aerosols). Phase out CFC use.

Young Einsteins

- * Recycle products (glass, plastic) to reduce coal usage. Much of Alberta's electricity comes from coal.
- * Control human population by educating people on family planning.

Dittu concluded by quoting noted astronomer Carl Sagan:

"If we ruin the Earth there is no place else to go. This is not a disposable world, and we are not yet able to re-engineer other planets."

By Stuart MacDonald

Grade 5, 1st Place

Stuart illustrated the cover of his essay on global warming with a drawing of the Earth, next to the Sun wearing sunglasses.

Scientists believe our Earth is the only planet which has life inhabiting it. The Earth is just right - not too hot like Venus, not too cold like Mars. There is water and air and the Sun gives us just enough heat and light.

Surrounding the Earth is the atmosphere... Because the atmosphere plays such an important role in maintaining life on Earth, big changes in the atmosphere would have a major effect on Earth.

Our Earth is warming up. We know this because the last major Ice Age was about 18,000 years ago. Since then, the average temperature has risen about 16 degrees Fahrenheit ... How can we explain global warming, especially in the last two centuries? Many scientists believe that the explanation is what they call the greenhouse effect.

Stuart described how the sun's heat or infrared energy is trapped by gases in the Earth's atmosphere.

If too much of these gases is released into the atmosphere, too much heat will be trapped and it will, by about 2050, be unbearably hot.

Rising seas is one major consequence of global warming, because as water warms it expands. Water expanding, plus glaciers melting, could mean the ocean rising two to five feet in 50 to 100 years. If this happens, whole shorelines could be swallowed up and entire cities could be threatened. Another major consequence would be the change in the weather. People and animals that are accustomed to cold weather will have to adjust to the hotter temperatures. For example, penguins and polar bears will be greatly affected ...

Stuart pointed to three main culprits in global warming - industrial chemicals called chlorofluorocarbons or CFCs, fossil fuels and deforestation. He suggested we eliminate CFCs, reduce consumption of fossil fuels, and preserve more forests. But he also quoted scientists and energy industry representatives who disagree about global warming.

If the "experts" cannot agree on how serious global warming is, then it means we should do more research. In this way, we can find out more about global warming and the greenhouse effect and perhaps come to an agreement about what can be done.

By Courtney Swan

Grade 6, 1st Place (tie)

Both Grade six first- place winners wrote about their "inventions." Courtney thought Child Alert would help safeguard children.

... Child Alert is a device that can be used by parents, police or even babysitters, to tell you where your child is.

Young Einsteins

The Child Alert is like an identification card the child will wear around his or her neck. The parents will be able to set a zone that the child is to play in. In the home there will be a monitor that will beep once the child leaves the zone. The monitor will have a map of the zone on the screen. A little red dot will locate the child.

If the parents want the child to come home, they will push a button that will send a signal to the identification card ...

The identification card will also have a button on it. If the child is hurt or in danger, he or she can push the button and this will send a signal to the monitor. The monitor will beep many times, telling the parents to call the police or to come to the child.

If the child gets kidnapped, the police will be able to locate the child with even more powerful monitors ... which would have larger maps of the whole city. As the child is moved from one part of the city to another, the red dot on the monitor will flash and show where the child is ...

Each identification card will have a different code, so that the police will know which child they are looking for. A computer will help the police to keep track of the codes ... If the child is taken out of the city, special satellite radio monitors can be used to track the child around the world.

You may ask, 'What if the identification card is taken off the child?' Well, the card could be hidden under clothes or it could even be sewn into clothes. It could also be put into jewelry such as locket, earrings and rings. Someday, this (device) could be so small that doctors will be able to put the electronic circuit inside the body somehow, like in tooth fillings ...

This identification card could make the whole world a lot safer.

By Ewan Fraser

Grade 6, 1st Place (tie)

I have invented a toothbrush with replaceable bristles.

If your shoe laces broke and your shoes were still good, would you buy new laces or new shoes? I can hear almost all of you saying, "New laces." If your toothbrush bristles wore out, would you rather throw out your bristles or your whole toothbrush?

That's why I invented this toothbrush: to cut down on waste and to improve its convenience. For example, if you have braces, you have to use two to three different toothbrushes to properly clean your teeth. But with this new toothbrush, you only need one toothbrush handle and two to three bristle cartridges.

Another feature of this toothbrush is its hollow handle. For example, if you are at a camp and you forgot your tube of toothpaste, you really didn't - there is toothpaste right in your toothbrush!

Simply remove the bristle cartridge you are planning to use next from the head of the toothbrush, and flip up the cap on the head of the toothbrush. Then hold the bristle cartridge slightly away from the head of the toothbrush and, to dispense the toothpaste onto the cartridge, slide the slider down the side of the brush. This pushes some toothpaste onto the cartridge. The toothpaste is kept from oozing out the sides of the handle by a clear plastic bag, filled with toothpaste.

To refill the hollow handle with toothpaste, screw a funnel (sold with the toothbrush) onto your tube of toothpaste. Then fit the funnel into the hole at the head of the toothbrush, and squeeze the tube of toothpaste to fill the hollow handle.

Then replace the cartridge onto the head of the toothbrush until it clicks. To release the cartridge, push the two buttons located at the top of the handle in unison, then pull the cartridge up and off the head of the toothbrush. Bristle cartridges would be sold in packages, in different sizes of cartridges depending on the size of your toothbrush . . .

Young Einsteins

If you forget your dental floss and you are at a friend's house for a sleep-over, don't go to sleep with your teeth full of junk - floss them. Because you DO have floss with you, if you own this toothbrush. It's on the lower end of the handle! Turn the crank to get fresh floss, reach in with ease and floss away . . .

This invention will get you off to a better start in the day. It also cuts down on waste, and makes it much easier than what it used to be to brush your teeth. It might cost a little more than the original toothbrushes do, but it is the only handle you will ever need . . .

Load-Date: November 30, 1991

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